

OBSERVATIONS

Rev. N. Anthony

ON

PLANETARY AND CELESTIAL INFLUENCES

IN

THE PRODUCTION OF EPIDEMICS,

AND ON THE

NATURE AND TREATMENT OF DISEASES.

BY JOHN S. BOWRON, M. D.

Late Commissioner of the State of New York in reference to Public Hospitals, &c.

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TO

JOSEPH M. SMITH, M.D.

PROFESSOR OF THE THEORY AND PRACTICE OF MEDICINE IN THE UNIVERSITY
OF THE STATE OF NEW-YORK.

DEAR SIR:—I avail myself of the opportunity presented by publishing, in a collected form, a series of letters on various subjects connected with the Science of Medicine, of addressing them to you. It affords me great pleasure to be able, on this occasion, to express my high regard for your distinguished Medical attainments and personal friendship. Although most of these Letters, in their separate form, were addressed to DOCTOR MOTT, a gentleman of preëminent standing in his Profession, and of universal renown—yet, as they have particular reference to Epidemic Diseases, a subject which you have so ably illustrated in your published works and public lectures, I have deemed it appropriate and proper, on this occasion, to address them to you.

I am most respectfully yours,

JOHN S. BOWRON.

NEW-YORK, JANUARY, 1850.



OBSERVATIONS, &c.

LETTER I.

DEAR SIR:—I intend writing, as occasion may offer, a number of communications addressed to you, upon subjects connected with the science of Medicine. These communications will appear in the form of a concise review, and will embrace some observations upon the deficiency of knowledge now existing among the Profession, on various important subjects.

A subject so important as this, and involving matters of the highest moment to mankind, should be treated with candor and frankness. I shall therefore be under the necessity of speaking upon the various topics which will come under review, with great plainness, and in a spirit which may be deemed by many unkind and ungenerous. But, as I shall say nothing but what I consider just, and imperatively called for, I shall rely with confidence upon the ultimate verdict of the public, to whom I shall appeal in these communications.

All must acknowledge, that, owing to some cause, public confidence in the medical profession has

greatly fallen off within the last few years. And truth must compel me to say, that in my opinion, the cause of this loss of confidence is justly chargeable to the profession itself. Instead of following up, and adopting all the improvements of the age in which we live, as well as the wisdom of the past, medical men have seemed to aim at discarding all auxiliary information, and are narrowing down to the smallest possible point a noble science, which should embrace every subject of human knowledge. Even *Hydropathy*, *Animal Magnetism*, *Medical Electricity*, *Homœopathy*, &c., are all legitimate subjects for medical enquiry, and have only become isolated fragments, torn from the temple of medical science by the culpable neglect of the profession itself. It shall be my object to show the connection, and importance of embracing in one comprehensive system all the scattered materials that rightfully belong to the science of medicine.

A thorough and competent knowledge of medical science, embraces a wider field of research than any other profession whatever. Indeed, all other sciences can be made subservient to principles of correct medical practice. It is owing to a deficiency of general knowledge of the principles of *Astronomy*, *Chemistry*, *Natural Philosophy*, *Mathematics*, and the science of organic life, that greater advancement in *Medical Etiology* has not been attained. We are too apt to consider organic life as an independ-

ent existence, uninfluenced by those changes in the material world, which are constantly operating upon all things around us. Whereas, it is an established truth, that animal life is only a forced existence, evanescent and fleeting as a shadow, and ultimately destroyed and annihilated by the more powerful and permanent laws of the physical universe. When, indeed, we carefully examine the fragile and casual forms of all organic existence, and survey the potent influences by which they are surrounded, we shall be led to wonder how forms so slender and feeble, are able to survive for a single day, amid the mighty powers which pervade the universe.

I shall endeavor to show that many doctrines taught by the ancients, but discarded by modern teachers of medicine, embrace important principles of medical philosophy essentially necessary to a correct understanding of the etiology of epidemics. Among these, I will only allude, on the present occasion to the influence they attributed to celestial and planetary influences, in the production of many of the most destructive of human maladies. The Humoural Pathology also, among the earlier physicians, was considered a most important branch of medical inquiry. Our modern professors, in their eagerness to condemn what they do not understand, have utterly repudiated one of the most important subjects of medical knowledge.

These cursory allusions to the subjects which will

necessarily come under review in these communications, I have thought proper to make in this prefatory manner, in order that the general objects I have in view may be understood at the commencement. It will not, of course, be expected that I shall enter into any of the details of medical practice in communications of this character. It would be both uninteresting to the public and foreign to my objects.

When medical science is studied in the comprehensive manner I have indicated, it will command the admiration and respect of the whole world. The learned, the wise, and the good will see for themselves, that the liberal and enlightened cultivators of a noble science are worthy of the respect and confidence of the public. It will not be necessary for small bodies of men to combine together for self-defence, against the assaults of impotent adversaries. But, relying with confidence upon the immutable truths of their science, they will pass by, unheeded, the noise and clamor of miserable pretenders, to exclusive doctrines and universal panaceas.

In treating the various subjects which will come under review, I shall aim at the greatest brevity consistent with a correct understanding of the questions examined. I shall avoid all merely technical terms, and speak in language which I conceive more appropriate and proper, when addressing the public as well as the profession.

I need scarcely remark that, although these communications are addressed to Dr. Mott, he has never been consulted upon the subject. His eminent standing in the profession, and his fame as a surgeon, is known throughout the world. It is therefore, fit and proper, that observations intended for the profession as well as the public, should be addressed to one, whose name and fame is the common property of all the cultivators of the science of medicine.

JOHN S. BOWRON, M. D.

LETTER II.

PLANETARY INFLUENCES.

DEAR SIR:—Perhaps no subject having reference to the health and longevity of mankind, has been so much neglected as the study of celestial and planetary influence in the production of epidemics. In all modern works upon the philosophy and etiology of epidemics, the subject is scarcely referred to, except in the vague and unmeaning terms of “epidemic influence of the atmosphere.” It is very possible, however, that Sydenham and Van Sweeten, when they used these terms, meant to refer to the operation of those planetary influences, as the cause of the production of this peculiar epidemic constitution of the atmosphere, to which they alluded.

In ancient times there was scarcely a shepherd on the plains of Babylon, or a tiller of the soil on the banks of the Nile, who was not better acquainted with the constellations of the zodiac and their supposed influence upon man and the seasons of the year, than those who are esteemed wise and learned in modern times. A sacred writer, anterior to the time of Moses, was no doubt thoroughly acquainted with the starry heavens, and the constellations of the zodiac; and he refers to them by the same names they now bear. "Canst thou bind the sweet influences of the Pleiades or loose the bands of Orion," are the poetic terms used by this ancient Patriarch, more than three thousand years ago. We may condemn the idolatry of the Egyptians in their worship of the stars of heaven, under the figure of the animals which represent the constellations; but we may be, at the same time profoundly ignorant of the causes which led to such worship.

If, at the rising of Sirius, the fertilizing waters of the Nile began to swell in its bosom, and finally overflowed its banks, carrying with it the rich treasures, productive of an abundant harvest, can we wonder that it should inspire the hearts of the Egyptians with adoration and worship. And was not the belief that Sirius produced, either directly or indirectly, the overflowing of the waters of the Nile, equally philosophical with any explanation of that annual occurrence that has been given in mo-

dern times? Neither should modern sciolists deride the wisdom of the ancient Chaldeans, in ascribing to **Aquarius** the production of the season of moisture and rain.

Every one would acknowledge the remarkable coincidence of the phenomena we have referred to, with the annual appearance of Sirius and Aquarius. Equally remarkable was the regular occurrence of the phenomena which constantly attended all the other constellations of the zodiac. Some were considered beneficent and the harbingers of good, whilst others were esteemed potent for evil, and the messengers of destruction. Among the most potent for evil, the constellation of Scorpio stood first and prominent. The wide-spread pestilence, attended with frightful mortality, which constantly attended its appearance, naturally suggested the name, indicative of the sting and venom of the serpent.

Had the ancient Chaldeans and Egyptians been acquainted with those laws of attraction and repulsion which control the physical universe, as discovered and illustrated by Newton, in all human probability they would have transmitted to posterity more philosophical views of terrestrial phenomena. What a flood of light they might have shed on all succeeding ages.

Profoundly accurate as they were in all their observations upon celestial changes, they still did not know that the world we inhabit, as it passed along

through the signs of the zodiac, in its annual revolution around the sun, would, at different seasons of the year, be influenced by various degrees and opposite forces of attractive and repulsive powers. Nor did they know that the great luminary of light and life, the sun of our system, was itself propelled onward in its revolving course, around other systems of the universe, by the same power of attraction and repulsion, but infinitely more complicated by surrounding forces, that operate upon all other material bodies. Nor were they acquainted with the character and motions of the planetary bodies composing our system, which, in their revolutions around the sun, must, at different points of their course, effect with greater or lesser intensity, all other bodies within reach of their attractive influence. Neither were they aware of the eccentric revolutions of those immense cometary bodies, that are sweeping through the immensity of space, and in their rapid career, are no doubt producing perturbations and disturbance in various systems of the universe. The cause of all those mighty movements in the physical creation, produced by the powers of attraction and repulsion, variously complicated, being unknown to the ancients, we can excuse them for not giving more philosophical explanations of natural phenomena.

But can we find any excuse for our modern teachers and writers on medicine, who we should

suppose are well acquainted with all these important principles of Astronomy, and yet have never given the subject the least consideration or attention whatever. They may possibly assert that, although these movements throughout the immensity of space, may effect the planetary system, yet organic life will still remain unaffected and undisturbed. They daily see the waters of the ocean lifted from their deep foundations into swelling tides, by the simple attraction of the moon, and yet will gravely assert that upon the fragile forms of organic life, this same attraction has no power. They are aware of the declaration of the celebrated Dr. Mason Good: "That worlds and systems of worlds, are not only perpetually creating, but also perpetually disappearing," and yet can discover nothing amid all this commotion of the universe that can disturb the feeble structure of man.

A happy illustration of the power and force of attraction, and its influence upon the movements of the heavenly bodies, and consequently upon organic life, may be seen in the planet Herschel. The discoveries of Leverrier, of Paris, and Adams, of Great Britain—names illustrious through all time to come—have made this subject familiar to every one. It had been observed by every Astronomer that the planet Herschel in its immense circuit around the sun, did not preserve a regular line, but was affected by powerful perturbations, and at

different times approached nearer, and again receded from the sun. These irregular movements suggested to the mind of Leverrier the idea that some other planet, as yet undiscovered in the regions of space, must, at certain periods, by the simple power of attraction, draw Herschel away from the regular line of its journey around the sun. The renowned Astronomer of Paris, by accurate mathematical calculations, continued for a long period of time, ultimately discovered the position of the undiscovered planet, which had produced the perturbations referred to.

Here we find the undoubted fact, that one of the largest planets of our system is made to pursue a tortuous and serpentine course around the sun, by the powerful attractive force of the newly discovered planet Neptune. Admit then, for the sake of argument, that Herschel is covered with organic life—feeble and fragile as organic life on our globe—what must be the effect of these opposing attractions—this year Neptune drawing Herschel millions of miles away from its direct course in its orbit, and next year the superior attraction of the sun, drawing that planet millions of miles nearer the great luminary of our system. Can any one have the hardihood to assert that changes like these, would not materially derange organic life in that planet? In my opinion, the fair and philosophical opinion would be, that if organic life could be called into

existence by one position of the planet in reference to the sun, the same organic life would be annihilated, and utterly destroyed, by another and different position in its course, effected by the attractive influence of the planet Neptune.

It is time that the Medical Philosopher should commence an examination of these things. When all the celestial influences are thoroughly understood, and the natural and complicated attractions of the whole material universe are fully appreciated, we shall be better able to comprehend the nature of pestilence and epidemic diseases. In referring back to the past history of the human race, and observing the periods of time in which mankind have perished, by unnumbered millions, throughout the world, we shall perhaps find that in many of those periods, instead of being cut off by pestilence, or the regular and slow decay of diseased organs, there has been, in fact, a rapid decomposition of the animal organization, effected by physical changes in the material universe.

And now that we are visited by that direful scourge of the human race, the Cholera, would it not become the medical philosopher to enter forthwith into an examination of this important subject? Perhaps it would be found that the immediate cause of the sweeping destruction of mankind which we now witness throughout the world, is produced by changes in the relative position of our globe, with

respect to other bodies, now revolving, with all their potent influences, through the immensity of space. That influences of this kind are constantly operating, and also constantly varying in force and intensity, is established beyond all controversy.

If some of our learned and intelligent medical men would devote the same time, zeal, and perseverance, to an examination of this highly important subject, that was shown by Leverrier of Paris, in his investigations of the cause of the perturbations of the planet Herschel, they would establish a reputation that would endure through all time.

JOHN S. BOWRON, M. D.

LETTER III.

COMETARY INFLUENCES.

DEAR SIR:—In my last communication I endeavored to show, from the perturbations in the movements of the planet Herschel, that the mutual gravitation of all planetary and cometary bodies must produce, at different times, great disturbance in their movements, and consequently very important physical derangements on their surface. But upon a subject involving so many important principles of philosophy, it may perhaps be expected that I should adduce more positive evidence in support of the

principles I have advanced. I shall therefore select a few prominent facts, from historical records, to corroborate the truth of the doctrines I am advocating. In the very brief reference I shall make to authentic history, I shall confine my remarks entirely to the influence of cometary bodies, although planetary influences may have been, during the same periods of time, equally powerful in the production of terrestrial changes, and in generating pestilential diseases. It was justly remarked by Ptolemy: "In the same manner the stars, fixed and erratic, as they keep on their course, cause many appearances about us; for they are producers of heat, and winds, and storms, by which all things on earth are suitably governed."

From the remotest antiquity to the present time, the annals of the world produce unceasing and abundant evidence of the connection subsisting between cometary and planetary bodies, and the commotions and disturbance that are almost constantly taking place on the surface of the earth. Earthquakes that frequently shake the whole world—volcanoes that belch forth from their burning craters tides of molten lava, spreading desolation on all adjacent regions—fearful and terrible agitations of the ocean, and hurricanes and tornadoes, that scatter destruction over the land, are among the most prominent effects of powerful celestial influences operating upon our globe. That such consequences would necessa-

rily result from the fixed and unalterable laws of gravitation, might be amply demonstrated from theory. But when, in addition to theory, we find the history of the world absolutely encumbered with the description of these events, it would be difficult, I imagine, to find a person who makes any pretension to scientific knowledge bold enough to call them in question.

It should be constantly borne in mind, that a pestilential atmosphere is frequently as deleterious to the animal and vegetable creation as to mankind. Even the waters of the ocean, and the tributary rivers, are often so much disordered by the physical changes going on in the material world, that all organic life within them is troubled with malignant disease and death. Hence we often hear from various quarters of the globe, about the time an epidemic pestilence is prevailing, of the destruction of vast herds of cattle and other quadrupeds. The fish of the ocean also perish in such myriads, that their floating bodies are cast in vast heaps on the shore, contaminating the atmosphere by their putrid exhalations. Even reptiles and insects do not escape the deadly influence which is blasting all organic life. And then again, the disordered elements which are spreading death among all existing organic bodies, is the immediate cause in many instances of generating other forms of life, before unknown, and which again soon disappear, when the elements assume their natural condition.

As immediately connected with the subject of the mutations and transitory nature of organic life, I might allude to the slower, but ever changing forms of animated existence, which geological discoveries have unveiled and brought to light. Myriads of animals and reptiles which inhabited the primeval world, and grew to such gigantic forms, amid the murky and humid atmosphere of the earlier days of creation, have all disappeared. Each succeeding change on the surface of the earth brought other orders of organic life into existence, which in their turn have perished and are seen no more. Thus, through the countless ages which have passed away since the first dawning of the primeval day, the steady but imperceptible terrestrial changes of our globe, in connection with celestial mutations, have brought forth into animated life new forms of existence, adapted to each peculiar condition in which they lived. One powerful cause of these endless changes no doubt originates from the slow but constantly progressive alteration in the relative position of our globe to other celestial bodies, as indicated in some degree by the orbit of the earth, which is leaving the oval and approximating to a regular circle around the sun.

A short time previous to the death of Vespasian, an immense comet appeared in the month of June. In November following, a tremendous ebullition of burning lava issued from Vesuvius, spreading de-

struction over vast tracts of country. It was during this eruption that the cities of Hurculanæum and Pompeii were buried under the torrents of ashes that were thrown out from the boiling crater of Vesuvius. The earth was at the same period shaken terribly with earthquakes, producing the utmost consternation among all classes of people, many of whom imagined that the world would be consumed with fire or reduced to ashes. This period of frightful commotion in the physical elements was followed by a most destructive pestilence in the eastern world ; ten thousand citizens of Rome perished in a single day. About the same time there were violent agitations of the ocean, accompanied with frightful thunder and lightning. The fish in the neighboring seas were utterly destroyed, and cattle by thousands perished in that region of the world.

About the year two hundred and fifty, a large comet made its appearance, and was followed by one of the most calamitous periods in the history of the world. A pestilence commenced in Ethiopia, on the borders of Egypt, and spread over the whole of the Roman empire, and extended to the northern parts of Europe. In Scotland, the ravages of the pestilence were so terrible, that the living were unable to bury the dead. In Asia Minor, scarcely a city or house escaped its desolating fury. Gibbon estimated that one half of the human species fell a prey to this frightful epidemic.

During this period, as well as most others in which a wide wasting epidemic has spread over the world, the atmosphere was loaded with impurities, and the waters of rivers were highly impregnated with unhealthy solutions. Myriads of reptiles and insects, before unknown, were swarming over the face of the earth; and a variety of animals grew to an unnatural size, thus exhibiting, in every possible form, the perturbed and disordered state of the material world. In the vegetable creation the same blighting influence was apparent. Indeed, the first manifestation of approaching pestilence among men often shows itself in the vegetable and animal kingdom. As a famine must necessarily follow a general failure of the fruits of the earth, and frequently precedes a pestilence, superficial medical observers have often attributed the epidemic to a scarcity of food, whereas both have resulted from the same cause.

In the year 400, a comet of horrible aspect and prodigious size made its appearance. Its immense coma seemed to sweep the earth as it passed along. Its effect upon all terrestrial things was most alarming and terrific. The Euxine sea was covered with ice for twenty days—an occurrence which never happened before. The heavens were completely changed in appearance, and resembled an immense canopy of brass. Deluges of rain swept in torrents over the earth, overflowing the hitherto impassable banks of rivers.

In 407 the world was astonished by the appearance of a celestial phenomenon, which measured the whole heavens, and by its singular form, impressed with terror the whole race of mankind. It continued four months and then disappeared.

Accompanying these celestial phenomena, were the most direful calamities that ever afflicted the world. Inundations of the rivers and the sea—violent earthquakes levelled cities, and tornadoes and hurricanes rushed over the whole globe with destructive fury. Famine and pestilence visited every quarter of the globe, and people perished by millions. Nearly the whole of Europe was depopulated.

In 1005 a comet of frightful aspect approached our system. A terrible eruption of Heckla in Iceland occurred a short time previous, and the whole of Italy was convulsed with violent earthquakes for more than three months. In the same year a desolating plague commenced its ravages, and continued for several years, spreading death and destruction over the whole earth. More than half of the human race perished by the pestilence. In innumerable instances the dying were tumbled into graves of the dead before they had expired. “At the close of this horrible destruction, Vesuvius discharged prodigious quantities of lava, which laid waste the neighboring country.”

From the year 1005 up to 1020, five comets ap-

peared at different intervals, and were uniformly attended with nearly the same calamities, violent eruptions of volcanoes, earthquakes, famine and pestilence.

I have taken these few instances of the remarkable connection between the appearance of cometary bodies and the direful ravages of malignant pestilence, at random, from among more than five hundred similar events recorded in history. To enter into a more minute detail in a communication of this kind would be unnecessary and improper. Any one disposed to examine the subject for himself, will find abundant materials in the writings of Tacitus and Thucydides among the ancients, and in the luminous pages of Gibbon and Webster among the moderns.

Although in the great majority of instances, there have been the most violent derangement and commotion in the physical elements, as well as pestilence, whenever a comet has approached the earth, yet it does not follow as a necessary consequence that this must always be the case. Undoubtedly a most potent and deadly poison can be generated by celestial influences, operating upon peculiar local causes, when all the material elements may appear calm and tranquil.

I deem it scarcely necessary to say that the celestial influences operating upon the earth, must almost constantly vary at different times. That the

electric condition of the atmosphere must be variously influenced is very obvious; but it is highly probable that these electric changes never directly produce any remarkably deleterious influence. They may, however, favor certain chemical changes which may be productive of malignant poisons. Another condition of the atmosphere, made somewhat notorious by the investigations of German Philosophers, who have given it the name of Ozone, is unquestionably produced by the same causes which are constantly modifying electric phenomena. Ozone, however, appears to be quite harmless in its action upon the human system, and I would not have alluded to it on the present occasion, if the subject had not obtained some importance from being frequently referred to in connection with the prevalence of the cholera.

It may be supposed by some that the great commotion and disturbance of the physical elements, as well as pestilence, which attend the approach of comets towards the earth, may be merely accidental coincidences. Reason and sound philosophy would be alone sufficient to refute any supposition of that kind, without the aid of other evidence; but fortunately we have such a multiplicity of facts to establish the connection and dependence of these phenomena, upon celestial influences, that I consider the subject entirely settled. The appalling calamities which invariably and universally attend the ap-

pearance of the comet, which completes its revolutions around the sun only once in 575 years, is alone sufficient to establish this fact. From the earliest period recorded in history up to the present time, the same frightful disturbance and commotion of the elements have regularly followed its appearance. In 1680 it approached so near the earth that Dr. Halley considered it miraculous that our globe escaped total destruction at that time. It will again make its appearance in 2255, and we can now predict that its appearance will be attended with the most eminent peril to our globe. It is about sixteen years since the pestilential cholera, which is now desolating our cities, first made its appearance on this continent; sixteen years previous to the time of its first appearance among us, it commenced its ravages at Jessore, in India—it will thus be seen that there are intervals of about sixteen years in the progress of this epidemic around the globe. That the grand cause of this fatal malady has its origin in planetary and celestial influences, operating upon terrestrial matter, I have no doubt. If we were as thoroughly acquainted as we should be, with the position and movements of the heavenly bodies operating upon our globe, either directly or indirectly, we should be able to point out the precise body, or particular conjunction of cometary and planetary influences, which are the cause of this pestilence; and we should probably be able to pre-

dict that fifteen years hence, this frightful epidemic will again commence its fatal journey around the world.

Hippocrates, the father of medicine, was so profoundly learned in physical astronomy, that he was able to predict, from celestial observations, the approach of pestilential epidemics. On one occasion he foretold the time when a pestilential disease would make its appearance, and sent his disciples into different countries, in order that they might be prepared to meet it on its first invasion. It was his profound knowledge of all subjects connected with the science of medicine, that commanded the respect and admiration of the world, and led the inhabitants of Greece to bestow upon him the appellation of a God, and decree to his name the sacrifices of Hercules.

It is a painful reflection, and humiliating to the members of a noble profession, at the present day, to find that, notwithstanding their boasted pretensions to superior knowledge, scarcely any one is familiar with the learning and philosophy of Hippocrates.

LETTER IV.

SOLAR INFLUENCES.

DEAR SIR:—I referred in my last communication to some historical facts in support of the doctrine that cometary, as well as planetary bodies, exerted a powerful influence on our globe; and that in consequence of their near approach to the earth, we might fairly attribute some of the most direful calamities that have afflicted the world. Since that paper was published I have had the pleasure of seeing in the last London Quarterly Review, the opinion of Sir John Herschel in reference to the physical constitution of cometary bodies. If the doctrines of Sir John Herschel be founded in fact, as I have no doubt they are,—then the opinions I have endeavored to establish receive high additional support and confirmation.

If, in connection with the powers of attraction and gravitation, comets have also a controlling electrical constitution, which may extend to regions far remote from their orbits,—their potent and destructive influence may, under certain circumstances, be even greater than I have hitherto attributed to them.

On the present occasion I shall confine my remarks, almost entirely, to a concise examination of the effects produced by the powerful operation of

solar influences upon the physical condition of the globe, and consequently upon organic life. For it may be fairly presumed, that planetary and cometary bodies have either directly or indirectly a similar influence, and therefore must produce in a certain degree the same effects upon terrestrial phenomena. The influences emanating from the sun, the great central luminary of the solar system, are generally benign and prolific of good. But this is by no means always the case. For we shall find, that at certain times and under certain circumstances, arising from change of position as well as important physical alterations on the solar surface —instead of having a salutary influence upon organic life, it is the source from which emanates those powerful principles of nature which frequently produce the most frightful destruction of human life.

It is a well established fact in philosophy, that the degree of light, heat, and electricity emanating from the sun is constantly varying in different seasons, and at different times during the same season. The greater or less intensity of the solar rays may therefore be the principal cause of the remarkable changes in temperature which characterize the climate of our globe. It must, however, be remembered, that peculiarity of soil, and particular localities, will variously modify the physical phenomena resulting from these changes of intensity in the lustre of the sun. We should not expect to see the same results

produced on the parched and burning sands of Africa, that we should witness on the succulent marshes of Messopotamia or the jungles of India.

It is the opinion of Sir John Herschel, that the varying degrees of lustre in the sun which have occurred since the formation of our globe, would be alone sufficient to account for all the geological changes which have transpired since that time. That these alterations of temperature have at one time clothed high northern latitudes with a tropical luxuriance of vegetation, and at another time covered the regions with a glacier crust of enormous thickness.

But the more immediate and temporary effects of these changes in the lustre of the sun, undoubtedly are manifested in a greater or less degree almost every year. The great difference in the temperature witnessed in successive summers, is produced in all probability, by this cause. Some philosophers have attempted to account for the unusual severity of some of our winters, by attributing them to the immense and unusual quantities of ice which is found heaped up in vast mountains in the neighborhood of the poles. But we may fairly presume that these immense pyramids of ice are produced by the same deficiency of lustre in the solar surface, which is manifesting itself, by its freezing influence, over the greater part of the globe. And our cold summers, which have frequently been attributed to immense

floating fields of ice, that often endanger the navigation of the ocean, are no doubt mainly produced by a diminution in the radiant energy of the solar rays.

It may be confidently asserted that caloric electricity, and the attraction of gravitation, are the primary cause of all the changes we witness among terrestrial things. Life, both animal and vegetable, through all its different shades and gradations, is dependent upon the action of these powers for its development. The circulation of the blood, and the diffusion of the sap which nourishes vegetable life, are entirely dependent upon modifications of the power of attraction, heat, and electricity, for all their phenomena. Then, again, when animal and vegetable life hastens to decay, these same elements are the omnipotent cause of their destruction, either by an excess, or diminution of their energies. In short, we may assert, that throughout the wide and illimitable expanse of the universe, all created existence is governed and controlled by these powers. The planetary bodies, which move over the whole unfathomed regions of the universe—comets, that sweep off in their trackless and rapid journey to the remotest boundaries of creation, are altogether dependent upon these few powerful agents for their existence and motion.

If we take into consideration the electrical power of the sun, which evidently is transmitted through

the whole extent of the solar system, as well as to the earth, we shall discover this powerful agent operating upon all created existence. The influence of electricity upon all matter, whether it be organic or inorganic, is universally felt. There is scarcely any change taking place in the animal, vegetable, or mineral kingdoms, but this subtle power is in action, modifying and controlling everything within its influence. It must be perceived by every one, that great vicissitudes in the electric condition of the atmosphere, arising from solar, as well as cometary and planetary causes, must under particular circumstances, promote the production of malignant pestilential poisons. It may also be perceived, that on many occasions, it operates directly upon organic life, producing many forms of disease, without the interposition of a morbid poison. When, therefore; the sun, the great fountain of electricity, either contains an excess or diminution of this power, all matter within the range of its widely pervading influence, must be more or less affected. Under some circumstances its action will be beneficial and salutary, and at other times potent for evil and destructive to organic life.

With the more obvious effects of electricity every one is familiar. It is witnessed in those terrific storms during which the whole firmament of Heaven appears in a blaze of fire, and shaken with the loud and awful noise of thunder. This horrid commo-

tion in the regions of the clouds, is all occasioned by the rapid transmission of electricity, from one point to another, and which usually produces at the same time, copious showers of rain. The Aurora Borealis which illuminates the northern skies, and cheers the dismal nights of the regions of eternal snow—the zodiacal light which decorates at evening the western firmament with its mildly radiant beams, are only other manifestations of electrical phenomena. It is electricity which at the present day, is carrying with the lightning's speed, communications from one end of the country to another. Indeed it is electricity, united in some inscrutable manner with attraction and caloric by which the whole solar system, as well as all other systems of the universe, are kept in harmony, through all the countless ages of time.

The influence of light and heat, which are other attributes of the sun, derived from the solar rays, is beautifully illustrated by the change of the seasons of the year. During the winter months all nature seems slumbering under the cold and icy hand of death. As we advance towards the polar regions, the horrid aspect of all terrestrial things becomes more terrific and appalling. Nothing is to be seen but mountains of ice, heaped up in frightful disorder, or level plains covered with a glacier crust, as far as the eye can reach. But on the return of the summer months in the temperate zone, where the

rays of light fall more directly upon the earth, in consequence of its change of position, the vivifying effect of the solar heat is immediately felt and seen. The vegetable creation which a short time previous appeared lost in death, now begins to awaken into life. The fields are soon clothed with a rich carpet of green, and the blooming flowers are filled with delicious odors which impregnate the air with delightful perfumes. The birds of the forest are cheered with the warm and smiling beams of the morning light, and express their gladness, in melodious songs addressed to the rising sun.

Every one is aware of these important consequences which result from a simple change of position of the earth's surface, in reference to the solar rays.—How much greater, then, must be the influence produced by a similar change in the position of the sun, in reference to that great mass of matter around which it has to revolve in its solar cycle. The perturbations of any of the planets of the solar system, when compared with the probable perturbations in the motions of the sun, in its journey through illimitable space, around other suns of infinitely greater magnitude and power, must be comparatively small and insignificant. Is it not fair and philosophical to suppose that all those powerful attractions, operating upon the sun from other systems of the universe, must have a mighty effect upon its physical condition, and consequently mo-

dify its action upon our globe, at various times. When the sun is carefully observed, we witness such rapid and extensive mutations on its external surface, as render almost unworthy of notice the disturbance which we behold on our planet. At one time we can see a mighty ocean of liquid matter heaving in sweeping waves over vast and unmeasured regions, and then again immense opening caverns, into which our globe might fall, almost un-felt and unseen.

I have thus briefly referred to the well-known powers emanating from the sun, each of which in its apparent separate manifestation, produces the most obvious and important changes on the earth. Even a simple modification of their intensity is sufficient to produce the most marked effects upon terrestrial things. When they are united in various combinations with other bodies and other elements of matter, how diversified are the effects which result from the local circumstances under which they act. Different degrees of moisture in the atmosphere will alone modify, in a remarkable manner, the effects of light, heat and electricity upon all matter, of whatever form. A peculiar modification of these elements arising from solar, cometary and planetary influences, may have generated the fatal poison of cholera, amid the marshy jungles of India. At another time, a different manifestation of these celestial powers may, on the banks of the Nile, or

on the plains of Asia, have produced that scourge of the eastern world, the plague. And again, under other circumstances of celestial influences and local causes, the deadly poison which produced the black death, many centuries ago, and which almost depopulated the eastern world, may have been generated. In short, the causes we have referred to are abundantly sufficient to account for every epidemic which has desolated the world.

Having, as I believe, sufficiently pointed out the close and intimate relation and connection between terrestrial phenomena, and celestial influences, I will on some future occasion endeavour to demonstrate, that animal life, and all living organic existence, are governed by the same physical laws, and are sustained by the same powers, that control the structure, and regulate the motions of the planetary bodies in their circuit around the sun. That attraction, electricity, and caloric, by their infinite modifications, perform every function of vitality, and animate the whole living organic creation. That as the attraction of the moon, charms into life the swelling tides of the ocean, so electrical attraction invites and propels the florid blood, regenerated in its passage through the lungs, in throbbing and beating tides, along the channels of the heart and arteries, to the extreme parts of the body. And that it is again returned by the same power, in a

dark and polluted stream, through the venous system, to be purified and fitted for the support of organic life, by the action of the living vital laboratory, the lungs.

LETTER V.

PHENOMENA OF LIVING BEINGS.

DEAR SIR:—I presume I need scarcely remark that although I have, on a former occasion, asserted that all the phenomena of animal life, are produced by physical and chemical laws, I by no means intended to say, that the living organic structure will not materially modify, in many instances, the character and special manifestations of chemical action in the different organs. It must not be forgotten, that electricity and animal magnetism, must be particularly taken into consideration, in all our reasoning and calculations upon the chemical developments of organized matter. Animal magnetism and electricity, unquestionably have a powerful influence in arranging and giving form to the first cell growth, from which the whole organic structure is reared. In studying the philosophy of animal life, therefore, we must constantly keep in mind, that there are other physical influences, besides simple chemical attraction, to be taken into ac-

count. In consequence of neglecting these important considerations, many eminent physiologists have been led to designate certain peculiar phenomena by the term of vital principles, as a separate and distinct power, altogether independent of physical and chemical laws.

On the present occasion, I shall confine my remarks to some of the most important functions of animal life—digestion, respiration, and the circulation of the blood. If it can be satisfactorily established, that these important functions are performed through the agency of chemical and physical laws, the inference is irresistible, that all other animal functions which are dependent upon these for their existence, must be governed by similar laws.

The *digestion of the aliment* destined for the support and nourishment of animal life, is now universally attributed to the operation of chemical influences. When food is taken into the stomach, it undergoes a proper solution in the gastric secretions of this organ, which immediately prepares it for other chemical changes, that are necessary previous to its passing into the intestinal canal; here it unites with the bile secreted by the liver, which, in conjunction with other elements and chemical influences, forms the animalized material denominated chyle. This is taken up by a system of vessels, everywhere pervading the intestinal canal, and carried through a larger channel, into the blood ves-

sels, which are pouring their contents into the heart and lungs. This is a concise statement of one of the most important functions of the animal body. As the whole phenomena of digestion is now admitted to be altogether a chemical process, it will be unnecessary for me to adduce other evidence of the fact, farther than to mention that a perfect illustration of the whole process can be effected, entirely independent of the animal body, by the ordinary operations of chemistry.

Perhaps the most important function of animal life is the *respiration of atmospheric air*. In mankind, the whole volume of blood destined for the nourishment of the body, has to pass through the lungs in its circuit around, through the arterial and venous system of vessels. The contaminated and polluted blood, loaded with carbonaceous matter and other impurities received from the veins, arising in all parts of the body, is collected in one main trunk, called the *vena cava*, and from thence it is poured into the right ventricle of the heart. From the right side of the heart the blood is propelled, or rather attracted, through the *pulmonic artery* into the lungs, where it permeates in all directions those spongy and delicate organs.—It is in the minute ramifications of the blood vessels, through the fine texture of the lungs, that the oxygen of the atmosphere is absorbed, and the carbon of the blood is thrown out of the body by

the process of respiration. When the blood has thus become purified by throwing out of the system the oppressive carbon with which the venous blood is loaded, and an absorption of the oxygen of the atmosphere vitalizes the circulating fluid, it is propelled, or rather attracted towards the left side or ventricle of the heart, through vessels called the pulmonic veins.

The indispensable necessity for vital air to support animal life, is apparent from the fact that no animated body of whatever kind can continue to live without a constant and unceasing supply of the oxygen of the atmosphere. All animated nature—the fish of our rivers, the aquatic inhabitants of the ocean, the birds of the forest, and the beasts of the field, are all equally dependent upon the vital properties of oxygen for their continuance in life. Take this from them, and they quickly and inevitably die. Take from them their ordinary food and they will still continue to live, for some days, or until the circulating nutriment contained within them is all exhausted. The fact therefore is placed beyond all controversy, that the vital principle of atmospheric air is the first and primary cause of organic life. The various forms and varieties of living beings, whether of the vegetable or animal creation, are dependent upon many other operating physical causes for their peculiar development; but every phenomena of life is dependent upon the vitalizing

principle of the oxygen of the atmosphere for their special manifestation.

The oxydation of the blood is entirely a chemical process, effected by the absorption of the vital principle of the atmosphere through the fine and delicate mesh work of the lungs, during the act of respiration. It is this oxydation which gives the arterial blood its florid color, and confers upon it the important attribute of vitality, and fits it for the support and animation of the whole organic structure. The celebrated John Hunter was therefore strictly correct when he asserted that the life was in the blood. Venous blood, taken out of the circulation, can be made to assume the florid color of arterial blood, by exposing it to the influence of the oxygen of the atmosphere, which will act upon it even when it is enclosed in the membranous structure of the bladder of an ox. It may therefore be briefly stated, that the most important function of animal life, the oxydation and vital endowment of the arterial blood, is altogether a chemical operation. If we are compelled to admit this fact, is there anything unreasonable in the doctrine that other functions of infinitely less importance, may also be produced by chemical action?

In reference to the cause of the *circulation of the blood*, a fundamental error has existed from the time of Harvey, down to the present day. Physiologists have uniformly attributed the circulation

to the contractile force and power of the heart; whereas the opposite of this doctrine is almost literally true. The action of the heart itself is produced and maintained by the same attractive power which controls the chemical action of the extreme capillaries of the system. In other words, it may be stated that the chemical attraction in the germinating cells, and capillary circulation, for the oxygen of the arterial blood, draws this fluid in a wavy, tidal stream, from the heart and larger arteries to the remotest parts of the system. In order to make this obvious to the general reader, I will briefly state, that the blood, after being purified and oxydated by the respiration of the atmospheric air in the lungs, passes from these organs into the left ventricle of the heart. From the left ventricle it is taken up by the great artery of the body called the aorta, and carried through various branches to every organ and capillary of the living body. In the minute and microscopic cells of the system, the oxygenated and vital properties of the blood are separated from the other elements of the circulating fluid by the physico chemical attraction and affinities of the organic structure for this vitalizing principle. After the oxygenated particles are thus separated by chemical affinities, the rejected, dark and polluted mass immediately alters its course and is attracted by an opposite power to the minute capillaries of

the lungs, through the large veins of the body, called the *vena cava*, in order that it may again be purified and fitted for animal life by the oxygen of the atmosphere. That this is the true cause of the circulation of the blood may be demonstrated by a few simple facts.

It is an established fact, that the circulation of the blood in the human body can be effected without the heart; for there have been many instances of the birth of a mature and perfectly formed infant, in which no heart has existed,—consequently the circulation of the blood must have been effected by some other power than that of the heart. I must not be understood to assert that the heart has no power and influence in assisting to propel the blood through the organic system. On the contrary, I am well aware that it must have a powerful auxiliary influence in aiding the circulation. I only mean to declare that the action of the heart is only a concentrated manifestation of the same power which has an independent and diffused existence, in every minute capillary of the system, the aggregate power of which is infinitely superior to that of the heart, and indeed produces its action.

Professor Carpenter, in his able work on physiology, contends that the power of the heart must have a great and indespensable influence upon the circulation in the capillaries, from the fact that their action will immediately be suspended when

the current of blood is obstructed in the main artery. But the action of the capillaries is not suspended from any want of propelling power in the heart, but simply because there is not a fresh supply of oxygenated blood, in consequence of the obstruction referred to. Let the obstruction of the circulation take place in the lungs instead of the aorta, and the heart itself, as well as the extreme capillaries, will instantly cease their action. Even where there is no obstruction, when an animal is made to breathe an atmosphere deprived of oxygen, the action of the heart and arteries is immediately suspended; and the circulation can again be instantly renewed by a fresh admission of oxygenated air into the lungs. These facts sufficiently prove that the capillary and arterial circulation is not suspended from a want of the propelling power of the heart, occasioned by an obstruction in the main artery; but simply from a deprivation of oxygenated blood, upon which the extreme capillaries are dependent for their action.

A beautiful illustration of the attractive power of the capillaries, in causing the circulation of the blood, may be shown by a reference to the circulation of the sap in the vegetable kingdom. If the stem of a vine, in which the sap is rising, be cut across, and the lower end of the upper division be placed in water, the attractive power of the leaves will cause a constant flow of the nutritive fluid

through all the branches of the vine, notwithstanding it is entirely separated from the main trunk and roots of the plant. If a shoot of evergreen be carefully engrafted on a stock of deciduous leaves, the attractive power at the ~~summit~~ will occasion a continual flow of sap through the supporting stock, even in the midst of winter. Again, it has been found that the annual flow of sap does not commence at the root, but in the neighborhood of the buds, which occasions a demand from below, which is supplied by the attractive power of the branches above.

“In the early embryonic condition of the highest animals, the movement of the blood seems unquestionably due to some diffused power, independent of any central impulsion; for it may be seen to commence in the vascular area before the development of the heart. The first movement is *towards*, instead of *from* the centre.”

Professor Carpenter thus concedes to the embryonic condition of animal life the true cause of the circulation of the blood, which he appears unwilling to allow in the adult form. Again, the fact has often been witnessed, that, in cold blooded animals, the circulation in the capillaries has continued for some time after a complete excision of the heart.

In the lowest animals the circulation is entirely dependent upon an attractive power in the extreme periphery; for in most of them no central organ,

or heart, exists. In the living sponge, a current of water is continually flowing through the tubes and channels, and is ejected in powerful streams through large orifices at the extremities. No mechanical cause for this movement can be found. In short, throughout the whole organic world, the same facts are witnessed, and they furnish abundant and overwhelming evidence that the circulation of the blood in the animal world, is not owing primarily to the contractile power of the heart, but is produced by an attractive influence in the extreme capillaries and *germinating cells* of the living body. The action of the heart affords only auxiliary support, and its propelling power is produced by the same attractive influence which is operating with such powerful energy in the capillaries of the whole system.

If the foregoing observations are founded on truth and sound philosophy, the science of *animal chemistry* must take a high position in the healing art, and lead to important modifications and improvements in medical practice.

When the study of medicine is made to embrace all the collateral sciences, it will assume that high position in the scientific world to which it will be justly entitled. Uniting the profound philosophy and wisdom of Hippocrates, the learning and science of the Eclectic Boerhaave, with the vast physiological acquirements of the advocates of the

doctrines of Liebeg and Matteucci,—it certainly will take the first rank among the learned professions of the present age.

LETTER VI.

ANIMAL ELECTRO-MAGNETISM.

DEAR SIR:—The brain, enclosed by the bones of the cranium and the spinal continuation of the medullary matter; together with the nerves which are distributed to all parts of the body, constitute the medium through which the different organs of the system are kept in harmonious action. It is also through this medium that animal life holds communion with the external world, and participates in the phenomena of the physical universe. In the distribution of the nerves to every part of the animal machine, they are found to accompany the blood vessels in their minutest ramifications. The nervous system is also divided into two grand divisions—at least so far as their functions are concerned. One portion consists of the nerves of sensation, which convey impressions received from without, and transmits them to the brain. The other division is called motor nerves, because they are the immediate instruments by which the muscular parts are excited to action or motion. These

several arbitrary divisions together, constitute the nervous system of animal life.

There can be no question but that the nerves are intended to transmit the electric current from one part of the system to another, and that in the normal condition of the body, they keep up an equilibrium of attractive influence between the various organs of the animal structure. The brain and spinal cord having connected with them, the two divisions of nerves—the motor nerves, and the nerves of sensation, bear a remarkable analogy to the galvanic battery and metallic wires, connected with it. The positive and negative wires of the galvanic pile corresponding in function with the nerves of sensation, and the nerves of motion, which are connected with the central medullary organs of the system. Every organic structure is more or less under the influence of electro-magnetism. The Torpedo, a well known inhabitant of the ocean, has within its body perfect galvanic apparatus, which it uses as a means of defence against the assaults of its adversaries. But even among the same species of animated beings, there is a great variety in the degree of intensity manifested by different individuals of the same class.

It is the nature and universal tendency of electro-magnetism to maintain an equilibrium of action among all celestial and terrestrial matter. We find, however, on particular occasions, that some cause

will produce an accumulation of electricity in one place more than in another ; hence we observe, when the atmosphere is loaded with aqueous materials, which collect in floating clouds, there are often vivid flashes of lightning darting from one point to another, and frequently it strikes the earth, accompanied with the awful noise of thunder. At other times the magnetic forces will rush over the surface of the earth in frightful whirlwinds, tornadoes, and overwhelming storms of rain and snow. And then again, when the whole northern regions of the earth become surcharged with electro-magnetism, it will discharge itself by flashing upwards towards the firmament of heaven in broad streams of light, illuminating all the northern skies with the beautiful Aurora Borealis. All these phenomena result from the physical necessity of maintaining an equilibrium of magnetic forces among all created things—a necessity as imperative in all the forms of organic life as it is among the planetary bodies of the universe.

Every act of respiration of atmospheric air, and every process of nutrition throughout the living body is necessarily attended by an alteration in the electro-magnetic condition of the system. When the vital fluid enters into a more solid form, electricity must always be evolved. And when the solid portions are broken down by decomposition, and pass into a liquid state, similar electrical

changes must occur. These mutations are constantly and incessantly taking place in every part of the organic frame. Hence the importance and necessity for proper conductors of the electric fluid from one part to another. This office is performed by the nerves. Other functions they undoubtedly have, but not without a development of magnetic forces. The optic nerve of the eye conveys impressions of sight to the sensorium. The auditory nerve of the ear receives the undulations of the atmosphere and conveys the idea of sound to the brain, &c. But all these phenomena are probably only modifications of the same forces, and light, sound, heat and electricity are but different manifestations of electro-magnetism.

In every class of animals, and even among individuals of the same class, there is some peculiarity of physical constitution which modifies, in a remarkable manner, their magnetic powers. It is undoubtedly owing to this and other associate causes, that different geographical positions and countries are inhabited by particular classes of the human family, and also by different species of vegetable and animal life. The naked negro, basking in the rays of a vertical sun, is not doomed to suffer by the intense heat of the climate in which he lives. On the contrary, he is naturally attracted to the burning atmosphere of the torrid zone, it being more congenial to his physical constitution. The

Esquimaux Indian, inhabiting the polar regions, amid mountains of ice and eternal snow, feels that frigid clime better adapted to his peculiar organization than a warmer latitude. And thus it will be found throughout the whole habitable globe. Although the human species have the power to accommodate themselves, in a great degree, to the vicissitudes of climate and change of country, yet it will be found that the physical peculiarities of different races, more than political necessity, make them prefer one country and certain localities to another.

In connection with the *external* physical causes which operate upon organic beings, and determine the localization of different classes of animal and vegetable life, there are other causes existing in the deep recesses of the earth which are, perhaps, equally powerful. There can be no doubt but that the central parts of the earth are filled by enormous seas of liquid fire, heaving and swelling with waves of burning matter. In this great laboratory of nature, situated under the external crust of the globe, and in some places approaching much nearer the surface than in others, there must occur electric and magnetic changes on a gigantic scale. As these chemical forces vary in different places, the magnetic effects upon particular localities must be very various, producing peculiarities of soil adapted to different physical constitutions of organ-

ic life. Hence we find the soil, in different countries, even in the same favorable latitude, assuming every variety of appearance and fertility. In one region we find a burning sandy desert, destitute of every species of verdure, and in another region, in the same latitude, luxuriant forests, springing from the richest mould.

Philosophers and naturalists, never having devoted sufficient attention to the consideration of the effects which these internal magnetic forces of the earth must have upon organic life, and the nature of the soil existing on the surface of the globe, have been unable to assign any reason why particular locations were found inhabited by particular classes of living beings, to the entire exclusion of other classes. It is known that every region of the world, and even different sections of the same region, are covered with forest trees and vegetation of distinct and separate classes and orders from what is found in other regions and districts in the same latitude. The beasts of the field are also separated into distinct communities of different animals, adapted by physical organization to the locations in which they are found. The aquatic inhabitants of the ocean are likewise distributed into an immense number of distinct groups, at various depths, and in different quarters of the deep and unfathomed sea. All these endless varieties of living beings naturally grow, and are as certainly attracted by the nature of the

soil and atmosphere and electro-magnetic forces, to their particular locations, as the needle is drawn towards the pole by the power of magnetism.

We thus find, throughout all nature, that everything is governed by physical laws, which, though few and simple, are yet omnipotent and powerful as the universe itself. All animate, as well as inanimate existence is strictly governed by these laws of attraction and electro-galvanism. Animal magnetism, which is only a modification of magnetic attraction, is the cause of all those mysterious movements of living bodies which have hitherto been considered beyond the reach of the human understanding. Recently, a species of vegetable has been discovered which points to the pole with the same unerring truth as the magnetic needle. Had that learned and distinguished body of men, who recently assembled in convention at Cambridge, taken time to reflect upon the universal operation of those physical forces, they would never have called in question the fact, as they did on that occasion, that the sun-flower is attracted by the solar rays, and is made to turn its blooming face towards the great luminary of light, on each revolving day. The power of attraction and gravitation operates with as much intensity of force upon the tender and delicate violet of our meadows as it does upon the stupendous mass of Jupiter, on its journey around the sun.

It is this magnetic power, differently modified, which causes the migration of birds from one clime to another upon the change of seasons. It attracts the water-fowl, which we observe, upon the breaking up of winter, on his pathless journey towards the northern lakes, with as much precision as the needle points to the pole. This same influence draws troops of frogs from the bottom of the oozy lake, and compels them to take distant journeys over the land.—The carrier pigeon, which has acquired a local physical constitution connected with some particular point, will, when removed to a distant place, return to the point from which he was removed. The dove, sent out from the Ark at the Deluge, after a wearysome journey over interminable waters, returned to its place of departure by the impulsive influence of ethereal magnetic attraction. These facts are not more marvelous than the revelations of the magnetic telegraph now in use all over the world. And the time is near at hand when the broad Atlantic will oppose no barrier to personal communication, through the medium of galvanic batteries placed on the opposite shores, and without the intermediate connecting wires. It is certainly less repulsive to reason and common sense, to attribute all those movements of organic life to physical causes rather than to refer them to a fictitious power, called instinct.

The same principles of philosophy will explain the cause of magnetic slumber produced under the influence of Mesmerism. And it is by no means impossible but that the clairvoyant may be so thoroughly charged with electro-magnetism, that he may be a living magnetic battery, communicating and receiving intelligence without the intervention of metallic wires. We should be careful how we refuse credence to facts which are attested by unimpeachable testimony, particularly if those facts are not inconsistent with principles of sound philosophy. We frequently meet with intelligent persons, who will treat with contempt, the doctrines of mesmerism, and animal magnetism, and yet with superlative satisfaction and assumed wisdom, profess the fullest confidence in the wildest and most improbable accounts of the movements of animals, which they attribute to the power of instinct—a term which means nothing, and is only believed in, because it is unsupported by any facts whatever. The scientific observer, will readily distinguish between the real facts which may fairly be attributed to the power of electro-magnetism, and those wild delusions of impudent imposters, who attempt to palm upon the public the most hideous impossibilities.

It will be very difficult to convince me, however, that the celebrated female Clairvoyante of Great Britain, can hold communication with Sir John

Franklin, who is, probably, locked up amidst mountains of polar ice. But I am perfectly willing to believe any fact, which is fully supported by abundant testimony, and which is not inconsistent with reason and philosophy. *Improbabilities*, however, must be supported by a large amount of evidence before we should fully believe in them. We should, however, carefully investigate every important subject, and examine all the facts connected with it, before we pronounce it impossible.

It must be apparent to every one, that the all pervading power of electro-magnetism, might be advantageously used as a remedy in a great variety of complaints. But it certainly will require a profound knowledge of the physical structure of organic life, to enable the practitioner to apply the remedy in a safe and useful manner. Persons entirely ignorant of anatomy and physiology, would most inevitably do great mischief in attempting to use a remedy so very powerful and pervading in its effects, as animal-magnetism.

It therefore becomes the imperative duty of the medical profession to bestow upon electro-magnetism their most zealous attention. It is a lamentable fact, that some of the most important remedies adapted to the treatment of the most afflicting maladies, have fallen into the hands of ignorant pretenders, simply because the medical profession have neglected to use them. But I am convinced that a

new era is now dawning upon the medical profession; and that in a very few years, all antiquated errors will be discarded, and in their stead, we shall have specific and valuable remedies introduced, founded upon the *chemistry of organic life*, adapted to the complete cure of diseases now considered beyond the reach of aid; and that Consumption, Scrofula, Gout, and Rheumatism, and other fatal diseases, will in a great measure cease to be a terror to mankind.

LETTER VII.

ORGANIC CONTAGION—POISONOUS FUNGI.

DEAR SIR:—The blood being the great source of life and animation to the animal body, and permeating as it does, every part of the living fabric, and affording the elements out of which the more solid portions of the organic structure are formed, it necessarily becomes in contagious diseases the seat and fountain for the propagation of morbid poisons. It will therefore be found that many of the most potent maladies which afflict mankind, effect primarily the normal condition of the blood.

There are undoubtedly many affections, which have their seat in the solids, arising from external violence; but they bear no comparison to that

frightful catalogue of disease, arising from other causes, which hurries to premature graves a large portion of the great family of mankind. I will in the following remarks, endeavor to point out the nature of those morbid poisons which prove so fatal in pestilential epidemics ; and indicate the general laws which govern and control their action upon the living body.

A very prominent distinction among morbid poisons, of organic growth, arises from the circumstance, that one class is produced from materials and causes altogether independent of the living body ; and another class which cannot be generated, except by a process peculiar to, and connected with, animal life. The most destructive forms of morbid poisons, are generally produced from a combination of local causes, with certain celestial and planetary influences. In all ages of the world, those desolating epidemics, which have swept over extensive portions of the globe, undoubtedly were brought into action by some remote general cause, acting upon terrestrial materials. The actual poison produced by this combination of causes, is evidently in most instances, if not in all, an organic substance of an animalcular or fungus growth. The recent discoveries of Dr. Britton have, in my opinion, completely established the fact, that the poison of *Cholera*, is an organic substance generated in certain localities, adapted to their production. This

organic poison, formed independently of the animal body, from among elements which exist in peculiar localities, will affect the human system many times—and indeed, as often as individuals sufficiently predisposed, are brought within its influence.

Dr. Britton also found, that beyond the immediate localities where Cholera prevailed, in districts where pure uncontaminated air was found, these organic fungi or animalculæ could not be discovered, and consequently such neighborhoods were not afflicted by the epidemic. These important facts are in strict accordance with the history of the progress of this desolating pestilence. In every country where Cholera has prevailed, it uniformly visited those localities where accumulated human filth and other impurities abounded. In such places the malignant poison would strike down its victims with frightful mortality. It was natural, therefore, for the ignorant populace, in various quarters of the globe, where Cholera prevailed, to imagine that the waters of their wells, or that their food had been poisoned; especially as they observed in other localities in their immediate vicinity, the inhabitants continued perfectly healthy. After a short period, it was always observed, that suddenly, and without any apparent cause, the pestilence would subside. This sudden visitation and abrupt departure, was undoubtedly occasioned by the natural germinating process of the organic poison, which required a cer-

tain time for its development, amid the corruptible materials of the locality. So soon as the materials or germinating matter, adapted to the growth of the poisonous fungi, becomes physically and chemically changed and exhausted, the pestilence must necessarily cease.

The Small Pox may be selected to illustrate the manner in which another class of organic poisons, are re-produced in the animal body. This kind of organic poison finds the ovarian germs, adapted to its fecundating influence, existing in the living structure. Hence, whenever the poison—or more properly speaking, the seminal matter of Small Pox is introduced into the system, it soon produces an action which by analogy we might compare to the ordinary process of fermentation, by which the whole mass of the circulating fluids becomes disordered. This germinating commotion of the living body, is continued for a certain time regulated by a fixed and definite law of progressive development, until it exhibits itself by an eruption and maturation upon the surface of an immense amount of matter, precisely similar to that which produced the disease. This universal impregnation of all the germinating cells, susceptible to the fecundating action of the poison, will necessarily obliterate nearly all the materials adapted to their re-production. Hence we seldom see a second attack of Small Pox.

There can be no doubt but that in the great majority of instances the organic poison which produces Cholera is generated in the localities where the disease prevails. It cannot be questioned, however, but that on many occasions the introduction of the organic fungi from abroad, into localities where the elements favorable to its propagation abound, has hastened its appearance in such sections, much earlier than would otherwise have been the case. When the Cholera poison has been introduced into the living body, it acts altogether as a foreign deleterious agent of malignant character, but it cannot be re-produced and multiplied from among the elements of the animal system. It is not therefore, strictly speaking, a contagious disease. Small Pox, on the contrary, is never reproduced, except from the germinating elements existing in the living organic structure; and it generally requires the introduction of a similar poison from another diseased person, to put in motion the fermenting process necessary for its development. Occasionally, however, certain celestial influences operating upon animal bodies constitutionally favorable to the growth of the organic poison, will originate the disease *de nova* without the introduction of the complaint from another person. Hence, we often hear of cases of Small Pox appearing under circumstances which totally forbid the supposition that it had been introduced from a foreign poisonous germ.

The effect of certain contagious eruptive complaints, in obliterating the germinating elements of disease, is very analogous to what is observed among the vegetable creation, and especially among the trees of the forest. It has been remarked by that elegant and accomplished writer Mrs. Somerville, that in all parts of the globe, the fact has been witnessed, that when extensive ranges of oaks and other kinds of trees are destroyed by fire, they are never succeeded by a growth of a similar kind. Other forms of vegetable life spring up in their places, and jungles of brush wood appear in grounds once covered with the majestic oak, or towering cedar. It is evident that the first growth had entirely used up the materials out of which they had originally been produced; consequently, no forest trees of that kind could again occupy the same soil.

To the philosophical observer of the harmony and unity of action among all created things of organic structure, these facts afford abundant evidence of the nature of that process, by which certain contagious complaints obliterate the germinating cells and materials, out of which the disease is formed, and thereby a second appearance is generally impossible.

From the known laws which control the time for the natural germinating process and development of all living beings, we have an explanation of the

cause, why Small Pox and other febrile eruptive diseases of contagious character, require a certain number of days from the first inception of the poison, to the period of their maturity and decline, to complete their natural course. It is precisely analogous to that which governs embryonic growth up to living maturity of all organised matter throughout the whole domain of animated nature. In the human species, nine months are required to bring the embryonic germ to maturity, and to complete physical perfection. Among the animal creation, the time varies according to the genera and species. In the vegetable kingdom, the germinating process is governed by a period of incubation peculiar to each class, and, consequently, varies almost indefinitely. Indeed, I may say in a few words, that all living beings of every class and species, whether among the animal or vegetable creation, or among that endless microscopic fungus existence which pervades the minute and most hidden recesses of nature,—all have a certain definite time from the first moment of incubation, up to the period of mature organization, to complete their natural physical developments.

I am warranted by abundant proof in asserting the fundamental doctrine, that all complaints which have a definite period to run through their natural regular course, *invariably originate* from an organic poison which requires a certain number of days, to pass

through the germinating developments of organic life in the human body. This period of development constitutes the regular period of disease, in all contagious complaints.

In order that the doctrine I am advocating may be more fully explained, I may state, that the ovarian germinating cells which are excited into fecundating action by poisonous fungi, producing the phenomena of disease, are all originally derived from the blood. Each particular organ and membrane of the animal structure is filled with invisible microscopic ovarian vessicles peculiar to themselves. Whenever, therefore, an organic poison of a specific contagious character, is brought in contact with these germinatiug cells, a particular form of disease is developed in the system, which varies in its manifestations, according to the nature of the organic poison, and the structure of the parts upon which its influence specially operates. It is highly probable that the paroxysms of intermittent fever are only the development of a germinating growth, brought into fecundating animation by the application of the malarious fungi, which are produced in marshy and fenny districts of country. The phenomena of eruptive typhus fever, as well as the Small Pox, and other diseases of that character, are simply the regular developments of organic life, which have been excited into living action by a process compared by Hippocrates to fermentation: which, in fact, is only the

germinating process of organic matter, animated into living motion by favorable circumstances of heat, moisture, and certain electrical conditions of surrounding mediums. Again, the invisible embryonic elements susceptible to the influence of other kinds of organic poisons, are exclusively confined to the cuticle, and are only excited into diseased action by inoculation or the application of a specific poison, as in cases of psora, elephantiasis, &c. The aphous in infants, is an example of another form of organic growth, confined to the lining membrane of the mouth. It will thus be found, that every distinct tissue—every organ and every membrane of the living body, has its own peculiar diseases, which cannot be propagated on different membranes, containing cells of a different structure. Analogous facts are witnessed among the different geological formations of the globe. Every variety of climate—every peculiarity of soil—the diversified waters of the ocean, and its tributary rivers—are all adapted to the production of certain species of living beings and not to others of a different genera.

To illustrate how completely and universally organic fungi and microscopic life pervades all matter, I may refer to the astonishing discoveries of Professor Ehrenberg. He has, in the language of Mrs. Somerville, found “infusori in fog, rain, and snow, in the ocean and in stagnant water, in animal and vegetable juices, in volcanic ashes, in pumice, and

opal, in the dusty air that sometimes falls on the ocean—they exist in ice and are not killed in boiling water." With these facts before us, we can easily understand how extensively impregnated the human body may be, with myriads of microscopic organic structures of various kinds. The animal cosmos undoubtedly exhibits on a minute scale precisely the same phenomena that we witness throughout the planetary system of the universe. Even those infinitely minute organic cells, which we have referred to, are themselves filled with other structures still more minute, but which in their living attributes manifest the same revolving course around their own proper axis, that we observe in the revolutions of our globe around the sun. This rotary motion of the germinal cells, has been happily alluded to by Professor Agassiz, but he omitted to explain the cause of this revolving motion, which is simply the universal power of magnetic attraction which regulates and controls the universe.

It would be difficult to determine whether Omnipotent power were more marvellously displayed by the creation of those immense planetary and cometary bodies, which pursue their course in the firmament of Heaven; or in that descending scale of organised beings, which pervades all matter, and diminishing in microscopic minuteness, until the most powerful magnifying instruments fail to ex-

hibit them. And even at this point, only commencing on the downward scale of infinite invisible life, and animated existence; and perhaps terminating in that great and only element and first cause, of all material ponderable matter which, for the want of a proper term, has been called caloric, electricity, or magnetism, and thus has been made to assume the denomination of secondary phenomena. In order to avoid confusion of ideas, and errors in language, it would be very important if some philosopher would give an appropriate name to that invisible power, from which all matter takes its varied forms, throughout the immensity of eternal and infinite space. Nothing would inspire the human mind with more sublime conceptions of the great architect of the universe, than to find in one simple element, yet without a name, the sole and only cause of all the phenomena of boundless creation.

The analogy found to exist between the phenomena of febrile complaints, and the germinating process of flowering plants, is most remarkable. From the time the flowers begin to open, there is a perceptible increase of temperature, but more especially manifested at the time when the pollen is diffusing its fertilizing dust upon the stygma of the flower. At the first dawning of the morning light, the temperature begins to rise, and continues

to increase, until the approach of evening, when there occurs a complete intermission of the flower-ing febrile phenomena. Thus, day after day, we observe the same regular paroxysms and intermis-sions produced by the embryonic development, which are witnessed in the phenomena of intermit-tent fever. These facts strongly corroborate the doctrine, that all intermittent febrile complaints, as well as eruptive contagious diseases, originate from organised fungi, passing through different stages of development among the germinating elements of the living body.

Although I have referred almost exclusively to the morbid poisons of *cholera* and *small pox*, yet it must be apparent that the same laws which govern and control these complaints, equally in-fluence the production of other diseases of similar character. There is abundant evidence in support of the opinion, that yellow fever, plague, and those destructive epidemics which, in past ages, almost depopulated extensive regions of the world, were all produced by organic fungi—poisons generated under particular circumstances of celestial influences and local causes, combined together. It is equally true, that measles, and a number of other eruptive complaints, including contagious typhus, are all produced by an organic poison, peculiar to each disease. All of those complaints, originating from

morbid poisons generated in the animal body, will prevail with more or less intensity in all seasons. Whilst those epidemic diseases, originating from poisons generated on the surface of the earth, and which often spread over different countries, with frightful mortality, never prevail except there should happen a peculiar conjunction of celestial influences and local causes, at the time of their prevalence. Hence, they often totally disappear for a period of many years.

Many forms of disease will often be produced by some derangement in the "quantitative and qualitative" elementary constituents of the sanguinous fluid. Diabetes is wholly owing to this cause. Gout and rheumatism are also produced by an abnormal condition of the chemical elements of the blood. And all those affections of the system, which have their seat in the embryonic cells of the animal structure, can be greatly accelerated or retarded in their course of development, by the peculiar conditions of the circulating mass, from which those cells are formed. Many morbid cell growths, which ultimately become frightful spectacles of the destructive ravages of disease, are solely dependent upon the disordered fountain of the blood, for their first commencement and ultimate progress. There can be no doubt but that cancer is made to strike deep its deadly and malignant roots,

among the glandular bodies of the system, in consequence of the fatal nutriment it derives from disordered blood. Hence, it happens that extirpation of cancerous tumours, afford no mitigation of this fatal malady, as it will again sprout up from other glandular bodies, situated in different parts of the vegetating soil of the living structure.

Recognising as I do in the fullest manner, the fundamental doctrines of the humoral pathology, I cannot omit referring on the present occasion, to that derangement of the blood, which lays the foundation for phthisis pulmonalis and scrofula. Owing to a variety of causes, some of which may be considered constitutional, the elements of the blood frequently become so much altered, that deposits in certain glandular bodies situated in the substance of the lungs, and on other parts of the human system are formed, which, after ulceration has taken place, constitutes either consumption or scrofula, according to the particular location of the disease. A minute and careful examination of the disordered glandular bodies of consumptive patients, has fully demonstrated the fact, that the disorganising process is strictly analogous to that which takes place in various stages of vegetable embryology. This circumstance connected with the well known fact, that tubercular diseases mostly prevail in malarious situations, in countries where intermittent

fevers abound, renders the doctrine of the fungus organic character of this destructive malady highly probable. But when we also take into consideration the phenomena of pulmonary consumption—its intermitting paroxysms of fever, followed by copious perspiration and other symptoms known to be produced by the operation of poisonous fungi, the proof of its exciting cause is sufficiently demonstrated. Scrofula, like consumption — another universal opprobrium of the science of medicine, undoubtedly has its chief origin in a disordered condition of the elements of the blood. Peculiarities of physical constitution disposes certain glandular bodies, situated in various parts of the organic structure, to be specifically affected by this form of disease. Hence we observe the glands around the neck, and those connected with the joints, as well as the mesentery, bear the chief force of this potent complaint.

It has been my object in this and the preceding communications to invite the attention of the medical profession as well as the public, to an examination of the great and controlling influence of physical causes, upon the organic structure of living beings, and consequently upon health and disease. In the language of the erudite Editor of the Medico Chirurgical Review, I may remark, that I have endeavored to "include in one category, the phe-

nomena of life in its minutest details, of molecular physics, of light, heat, electricity, and galvanism, and the vast bodies that move through eternal infinite space, and submit them to the operation of the simple laws of terrestrial and celestial motion." I need scarcely observe that for most of the facts from which I have drawn my deductions, and upon which I have based my doctrines, I am greatly indebted to the medical philosophers of Europe, as well as to those of this country; and among the latter, I ought particularly to mention the names of Professors Dickson, Parker, and Draper of this city, and Professor Mitchell of Philadelphia. If the doctrines I have advocated be sound, then it must necessarily follow that the only true principles of practice must be based upon the *chemistry of organic life*. The learned reviewer, whom I have just referred to, candidly confessed, that it only required the substantial support of demonstrative proof—which, in my opinion, has been abundantly afforded—to render the *dualistic principles*, which are founded on the general laws of the physical universe, everywhere prevalent.

It has probably been observed, that I have said comparatively little about the details of practice. To have entered into disquisitions of that kind, would have been entirely foreign to my object. In fact, medical practice is a very simple matter, when

the causes of disease are thoroughly understood. If the causes of the phenomena of morbid action are not known, all practice adopted for their removal is gross empiricism. The whole system of rational scientific practice is in fact embraced in the concise aphorism of Hippocrates "*Contraria contrariis curantur.*"